

SUMMARY

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3384

CHICAGO, ROCK ISLAND AND PACIFIC
RAILROAD COMPANY

IN RE ACCIDENT

NEAR CLIO, IOWA, ON

DECEMBER 26, 1950

SUMMARY

Date: December 26, 1950

Railroad: Chicago, Rock Island and Pacific

Location: Clio, Iowa

Kind of accident: Rear-end collision

Trains involved: Freight : Passenger

Train numbers: Extra 117 West : 39

Engine numbers: Diesel-electric : Diesel-electric
units 117, 107B units 641,
and 107 639B and 640B

Consists: 98 cars, caboose : 14 cars

Estimated speeds: Standing : 50 m. p. h.

Operation: Signal indications

Track: Single; tangent; 0.96 percent
descending grade westward

Weather: Cloudy

Time: 3:58 a. m.

Casualties: 17 injured

Cause: Failure to operate following train
in accordance with signal
indications

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3384

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

CHICAGO, ROCK ISLAND AND PACIFIC RAILROAD COMPANY

March 28, 1951

Accident near Clio, Iowa, on December 26, 1950, caused by
failure to operate the following train in accordance
with signal indications.

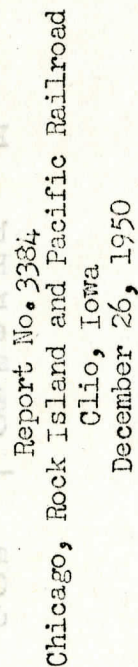
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On December 26, 1950, there was a rear-end collision between a freight train and a passenger train on the Chicago, Rock Island and Pacific Railroad near Clio, Iowa, which resulted in the injury of nine passengers, four dining-car employees, one club-car attendant, one railway-mail clerk and two train-service employees. This accident was investigated in conjunction with a representative of the Iowa State Commerce Commission.

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Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



STOP AND
PROCEED

Location of Accident and Method of Operation

This accident occurred on that part of the Missouri-Kansas Division extending between Eldon Yard, Iowa, and Trenton, Mo., 119.3 miles. Between Allerton and Clio, Iowa, located, respectively, 68.4 miles and 75.6 miles west of Eldon Yard, this is a double-track line, over which trains are operated in either direction on either track by signal indications. Between Clio and Tindall, Mo., 113.7 miles west of Eldon Yard, it is a single-track line, over which trains are operated by signal indications. Between Allerton and Clio the main tracks are designated from south to north as south track and north track. The accident occurred on the main track at a point 2.09 miles west of the end of double track at Clio. Westward from the end of double track there are, in succession, a tangent 1.49 miles in length, a 2° curve to the left 810 feet, and a tangent 2,353 feet to the point of accident and a considerable distance westward. The grade for west-bound trains is, successively, 0.35 percent ascending 900 feet, level 400 feet, 0.18 percent descending 400 feet, and 0.96 percent descending 200 feet to the point of accident.

Semi-automatic signal R48A, governing west-bound movements from the south track to the single track at Clio, and automatic signal 3745, governing west-bound movements on the single track, are located, respectively, 2.19 miles and 1,025 feet east of the point of accident. Signal R48A is a dwarf signal of the color-light type, and is continuously lighted. Signal 3745 is of the color-light type, and is approach lighted. Each signal displays three aspects. Aspects applicable to this investigation and the corresponding indications and names are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
R48A	Green-over-Red	Proceed.	CLEAR
R48A	Yellow-over-Red	Proceed, immediately reducing to 30 MPH, or slower if necessary, prepared to stop before leading wheels pass the next signal.	APPROACH

3745	Red, over number plate	Stop, Then Proceed at Low Speed through the entire block.	STOP AND PROCEED
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Signal R48A and the power-operated switch at the end of double track are controlled from a traffic-control machine located at Trenton. The machine is equipped with visual indicators on the control panel to show track occupancy of each OS section and track occupancy between the OS sections, the position of each power-operated switch, and whether each controlled signal is displaying an aspect indicating proceed or an aspect indicating stop. The OS section at Clio extends between the opposing controlled signals at the end of double track. The control machine is also equipped with an automatic train-graph, which records the time that each OS section is occupied. The controlling circuits of signals 3745 and R48A are so arranged that when the route is lined for a west-bound movement and the block of signal 3745 is occupied, signal 3745 indicates Stop and Proceed and signal R48A indicates Approach.

This carrier's operating rules read in part as follows:

DEFINITIONS.

Low Speed.--A speed that will permit stopping short of train, engine, obstruction or switch not properly lined and looking out for broken rail, but not exceeding 15 miles per hour.

35. Flagging Signals.--The following signals will be used by flagmen:

* * *

Night signals	(A red light, (A white light, (Torpedoes and (Red fuses.
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99. Flagging Rule.--When a train is moving under circumstances in which it may be overtaken by another train, the flagman must drop lighted red fuses at proper intervals, and must continue observation to rear and take necessary action to insure full protection.

When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and, when necessary, in addition, displaying lighted red fusees. When recalled and safety to the train will permit, he may return, and when conditions require, he will leave the torpedoes and a lighted red fusee.

When a train is seen or heard approaching before a flagman has reached a sufficient distance, he must immediately place torpedoes and continue toward the approaching train, giving stop signals.

107. Co-operation Between Crew Members.--* * *

(6) * * *

When the conductor or engineer fails to take action to stop the train, and an emergency requires, brakemen and firemen must take immediate action to stop the train.

The maximum authorized speeds were 70 miles per hour for passenger trains and 50 miles per hour for freight trains.

Description of Accident

Extra 117 West, a west-bound freight train, consisted of Diesel-electric units 117, 107B and 107, coupled in multiple-unit control, 98 cars and a caboose. This train passed Allerton, the last open office, at 3:21 a. m., passed the end of double track at Clio at 3:48 a. m., and stopped with the rear end 1,025 feet west of signal 3745. About 4 minutes later the rear end was struck by No. 39.

No. 39, a west-bound first-class passenger train, consisted of Diesel-electric units 641, 639B and 640B, coupled in multiple-unit control, three baggage cars, one baggage-mail car, one club car, two coaches, one dining car, and six sleeping cars, in the order named. The first car was of steel underframe construction, and the other cars were of all-steel construction. This train passed Allerton at 3:50 a. m., 2 minutes late, passed the end of double track at Clio at 3:56 a. m., on time, passed signal 3745, and while moving at an estimated speed of 50 miles per hour it struck the rear end of Extra 117 West.

The caboose and the ninety-third to the ninety-eighth cars, inclusive, of Extra 117 West were demolished. The ninety-second car was slightly damaged. The Diesel-electric units, the first four cars, and the front truck of the fifth car of No. 39 were derailed. Separations occurred between the Diesel-electric units and between the first and second, second and third, and third and fourth cars. The first Diesel-electric unit stopped on its left side, with the front end 330 feet west of the point of accident and 68 feet south of the track and the rear end 25 feet south of the track. Both trucks and all appurtenances between the trucks were torn from the underframe, and the unit was badly damaged by fire. The second Diesel-electric unit stopped upright, with the front end against the rear end of the first unit and the rear end on the track structure. The third Diesel-electric unit stopped upright and in line with the track, with the front end against the rear end of the second unit. Both the second and the third units were considerably damaged. The first car stopped on its left side, south of the track and at an angle of about 45 degrees to it. The second car stopped upright, across the track and at an angle of about 90 degrees to it. The third car was derailed to the north and stopped upright, at an angle of about 45 degrees to the track, with its rear end against the front end of the fourth car. The fourth and the fifth cars stopped upright and in line with the track. The first three cars were badly damaged, and the fourth car was somewhat damaged.

The engineer and the fireman of No. 39 were injured.

The weather was cloudy and the temperature was about 12 degrees above zero at the time of the accident, which occurred about 3:58 a. m.

The Diesel-electric units of No. 39 were equipped with 24-RL brake equipment, but were not equipped for dynamic braking. Diesel-electric unit 641 was provided with a type D-24 HSE automatic brake valve and type S-40-D independent brake valve. Main reservoir pressure of 140 pounds was maintained, and the feed valve was adjusted to supply brake-pipe pressure of 100 pounds. A safety-control feature was provided. There was no emergency brake valve on the fireman's side of the control compartment. The second and the third Diesel-electric units, each were equipped with an emergency brake valve.

Discussion

Extra 117 West was operated over the south track between Allerton and Clio and stopped about 3:35 a. m. at signal R48A, which indicated Stop. After an east-bound passenger train passed Clio the indication of signal R48A changed from Stop to Proceed, and Extra 117 West departed. The flagman said that when the train stopped at Clio he provided flag protection, and that before he returned to the train he placed two torpedoes on the rail and left a lighted red fusee on the track. Soon after the train started, the conductor, who was in the cupola of the caboose, observed sparks flying from underneath a car near the rear of the train. He dropped a lighted red fusee to the track, then displayed a second lighted red fusee on top of the caboose as a signal to the enginemen to stop the train. The train stopped with the rear end 1,025 feet west of signal 3745. The flagman said that before his train stopped he could see the reflection from the headlight of No. 39. He immediately lighted a red fusee and proceeded eastward to provide flag protection. He placed two torpedoes on the rail a short distance east of the caboose and then continued eastward and gave stop signals with the fusee. He said that his stop signals were acknowledged by the engineer of No. 39, but that there was no apparent reduction in the speed of that train before the collision occurred. He was not sure of the exact location of No. 39 at the time his signals were acknowledged.

The brakes of No. 39 were tested at Rock Island, Ill., 110.4 miles east of Eldon Yard. Between Rock Island and Eldon, 0.6 mile east of Eldon Yard, they functioned properly when used. The engine crew of this train was changed at Eldon, and a running test of the brakes was made when the train departed from that station. The engineer said that the brakes were used in making a station stop at Centerville, 38.1 miles west of Eldon Yard, and in reducing speed at points located 27.8 miles, 55.1 miles, 63.2 miles, and 68.4 miles west of Eldon Yard, and they functioned properly. As this train was approaching Clio the speed was about 60 miles per hour. The enginemen were in their respective positions in the control compartment at the front of the first Diesel-electric unit, the conductor and the brakeman were in the fifth car, and the flagman was in the rear car. The headlight was lighted brightly. Both the engineer and the fireman said that they observed the aspect of signal R48A and that the signal indicated Proceed. When the train was about 1.5 miles east of signal 3745, they observed that this signal indicated Stop and Proceed. The engineer said that he immediately closed the throttle and placed the automatic brake valve in service position. He said that the exhaust from the brake valve was very short and

that the gauges indicated no appreciable reduction in equalizing-reservoir or brake-pipe pressure. He then placed the automatic brake valve in emergency position and removed his foot from the pedal of the safety-control feature, but neither of these actions was effective in reducing the brake-pipe pressure. He did not place the independent brake valve in application position. The engineer and the fireman said that they did not hear the explosion of a torpedo or observe a lighted fusee in the vicinity of Clio or between Clio and the curve to the left immediately east of the point where the accident occurred. While their train was moving on this curve, they observed the stop signals given by the flagman of Extra 117 West and also the lighted markers on the caboose. The stop signals were acknowledged by the engineer. The engine-men said that after they realized that the speed of their train could not be controlled by the use of the automatic brake valve there was not sufficient time before the collision occurred for either of them to reach the emergency brake valves located to the rear of the control compartment. The members of the train crew said that they noticed nothing unusual in the handling of the train prior to the time of the collision. They said that there was no application of the brakes between Clio and the point where the accident occurred.

Examination of the equipment of No. 39 after the accident occurred disclosed that all angle-cock handles were in proper position. The brakes of the cars which were not derailed were tested and functioned properly. The piping was scraped from the under side of the frame of Diesel-electric unit 641 in the accident, and before the brake equipment on this unit could be tested it was necessary to simulate the equivalent of a brake pipe and eight brake cylinders. The main reservoir was then charged, and various application and release tests were made. The top portion of the automatic brake valve was then removed and the interior was checked for indications of rust or water. No defective condition of the brake equipment was found. Because of extensive damage to the piping under the floor of Diesel-electric unit 639B, it was necessary also to simulate the equivalent of the brake pipe and the brake cylinders of this unit. Tests were then made and no defective condition of the brake equipment was found. After repairs were made to damaged piping under the floor of Diesel-electric unit 640B, the brake equipment of this unit was tested and functioned properly.

The signal system is so arranged that when the route is lined for a movement from signal R48A to signal 3745 and the block between these signals is clear, the aspects of signal R48A are controlled by a polarized line circuit. The polarity of this circuit is determined by the position of a pole changing relay at signal 3745. If signal 3745 indicates

either Approach or Proceed, the relay is energized and the control circuit of signal R48A is of such polarity that this signal indicates Proceed. If signal 3745 indicates Stop and Proceed, the relay is de-energized, the polarity of the control circuit of signal R48A is reversed, and the signal indicates Approach. This relay also controls the approach lighting circuit of signal 3744. This signal governs east-bound movements and is located opposite signal 3745. It is lighted only when the relay is de-energized, and under this condition the circuits are so arranged that the indication of signal R48A will not be more favorable than Approach. When the route was lined for the movement of Extra 117 West, the blocks of signals R48A and 3745 were clear. The fact that signal R48A indicated Proceed for the movement of this train indicates that the signal system was functioning properly at that time. Members of the crew said that signal 3744 was lighted after their train passed signal 3745. This establishes the fact that the relay was de-energized after Extra 117 West entered the block of signal 3745, and under this condition signal R48A should have indicated Approach for the movement of No. 39. The train dispatcher said that he noticed nothing unusual in the operation of the traffic-control machine prior to the time the accident occurred. The pole line which carries the signal-control circuits was damaged in the accident, and tests of the signal apparatus could not be made until a temporary line was installed and the traffic-control system restored to service. Inspections and tests of the signal apparatus in the vicinity of the point of accident were begun by signal forces of the carrier about 14 hours after the accident occurred. No condition was found that would have caused an improper operation of the signal system.

Cause

It is found that this accident was caused by failure to operate the following train in accordance with signal indications.

Dated at Washington, D. C., this twenty-eighth day of March, 1951.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.